



# The LongPath

A North Alabama DX Club Publication

## Special points of interest:

- From the President
- April Program
- March Meeting Minutes
- Rise and Fall
- The Thing
- DX Contests

Is it spring fever that's keeping me away from the radio? While I have turned the knobs on a few occasions it seems that other obligations in March kept me away from the radio more than usual. The storm damaged doublet still needs fixing. Same for the arced tuner of a few months ago.

I did find time to attend the Tullahoma Hamfest on March 11. The threat of wintery precipitation made for a smaller-than-usual crowd and it was attended by the ARRL Delta Division Vice Director and the TN Section Manager. Found an Elk River climbing harness barely used. Came with a fall arrest & positioning lanyard. That find and few other goodies made me glad for making the trip.

The Dayton (Xenia) Hamvention is about a month away with myself and several other club members planning to make the annual pilgrimage. Guess I'm so excited about it I'm writing about it a month early.

Is ARRL Field Day on your agenda? Traditionally our club provides a lot of equipment & operating expertise to the Huntsville club's K4BFT effort and I hope this continues.

At our last meeting two funding requests were brought forward for consideration. It was agreed that those would be published here for folks to study and consider before continuing to a vote at the upcoming meeting. Here are those requests:

## How to Join

- \* Come to a club meeting;
- \* or send in an application by mail (form on [www.NADXC.org](http://www.NADXC.org))
- \* or call Tom Duncan at (256)705-2147

## From the President

By Mark Brown, N4BCD

1. From Ron Doyle, N8VAR on Feb 17, 2017... I'm joining Don Dubon, N6JRL and Jim Storms, AB8YK on the Dave Kalter Memorial Youth DX Adventure to Costa Rica this year.

2. Request for funding received Mar 11, 2017... We are EA3BT (Josep Gibert) & EA3WL (Nuria Font) and are really pleased to show NORTHERN ALABAMA DX CLUB our new project: GUINEA-BISSAU 2017 DXPEDITION (J7B & J5W) from April 7 to April 15.

Personally I'm between neutral & positive on the first one. While it's not a rare entity, it seems a worthy cause. I'm opposed to the second one - this was a very late solicitation (actually it's already underway), it's a husband / wife team, and not very rare.

Thankfully we live in a democracy and decisions like this are not mine alone to make. Please contemplate these funding requests and make your vote count at our next meeting.

For a final.... Please join our growing Tuesday night's conversations on the North Alabama DX Club Net on the W4QB repeater (147.30 PL 103.5). We begin with WWV tone at 0801 or 0802z and carry on for 20 or 30 minutes of radio related banter. Those of course are on the Tuesday's when we're not at the meeting at Golden Corral.

73,  
Mark N4BCD

## Elegant Improvements in Ham Radio Design: 1960-1990

Program by Bob DePierre, K8KI

News Flash: There is a tremendous difference between the ham station of 1990 (and certainly the station of 2017) and the ham station of 1960. But what specifically? Bob's program will clue us in. Be at the Golden Corral around 6:00 pm for dinner, 7:00 for the business meeting, and 7:30 for Bob's program. Old Timers note: there will be a closed-book exam!



## March Meeting Minutes and Treasurer's Report

By Kelley Johns, W4VPZ-NADXC Secretary/Treasurer

### Attendance

Members 17, Guests 2

### Announcements

Mark N4BCD noted this item from ARRL.ORG on 3/10/2017 :

### Teen Radio Amateur to Activate Iceland on his Inaugural DXpedition

"Fourteen-year-old Mason Matrazzo, KM4SII, of Clemmons, North Carolina, will be on the air from Iceland as TF/KM4SII, March 13-19. Activity will be on 40, 20, and 17 meters, SSB only. Mason, who will be operating with a portable setup, is calling it his "Buddistick™ DXpedition to Iceland."

Mark also reports:

*This kid showed up on our W4QB repeater this past Sunday evening! He put out a lucid call that he was visiting the area and asked if this was the local DX machine. We chatted for a short time and he said he'd been outside all day doing a trial run on his station. He was licensed last June. Almost 20K look-ups on QRZ'd. WAS and 127 countries.*

It's possible that the typesetter may have dropped the tray of letters containing the headline to my Longpath article, The Tale of the Six Hour Antenna article. It certainly couldn't be the fault of the publisher that it became Tail T A I L. [From the LongPath Excuses Department: What typesetter?—the LongPath staff doesn't believe in movable font.—Ed.]

Dayton Hamvention website was updated March 13 with 162 / 194 vendors listed. The discrepancy between those numbers is believed to be listed club & organizations.

DXpedition to Bangladesh starts this week.

VQ96JC is again active from Chagos Islands (#141), with ND9M at the radio from Diego Garcia Island for a Field Day

-style operation. It's a bit involved. He takes a boat to the island, "lugs everything to 'Fire House Park,'" where 120 V ac is available, sets up the radio and antennas, operates for about 3 hours, then takes everything apart again, packs it up, and returns to his ship, anchored offshore.

Someone asked if anyone has heard the Nepal DXpedition and no one had.

Chuck N4NM reported that Chris KF4MMF was home and recovering from his surgery. He is doing well and appreciates everyone's get well messages.

### Membership Applications

Mark Morgan AF7KE and Jean Morgan KG7NJQ submitted membership applications and were added to the North Alabama DX Club roll. Welcome!

### Treasurer's Report

Beginning Balance	\$ 3,835.29
-------------------	-------------

### Credits

Dues pd (cash) for 2017	\$ 35.00
-------------------------	----------

Dues pd (Paypal) for 2017	\$ 322.01
---------------------------	-----------

### Debit

Web domain 2017	\$ 13.32
-----------------	----------

Ending Balance	\$ 4,178.98
----------------	-------------

### Old Business

None.

### New Business:

We received two requests for funding, see Mark's *From the President* on p. 1 for details. As discussed, we decided these expedition announcements would be printed in the next LongPath ahead of a funding decision at the April meeting.

The Tuesday night DX net is active at 8:00 on weeks that we do not have monthly meetings. Johnny KR4F shared a little history about the DX Club net.

Years ago the (then) Wednesday night net was active for members to check in with their DXCC countries worked and to update a central computer database. Warren Trowbridge would generate a printed DXCC list and hand it out at meetings. Our recently-revived DX net is more social in nature.

Mark asked for individuals to write about whatever projects they're working on for the newsletter.

Craig NM4T is downsizing and selling equipment. He will need some help dropping his tower in April or May; it is a 48' Rohn 25 with all accessories. The tower and other gear will be inventoried and a list will be made available soon.

### Bouvet Thank-You

The Bouvet DXpedition team has acknowledged our support: see

[www.facebook.com/groups/639362206232014/permalink/745548642280036/](http://www.facebook.com/groups/639362206232014/permalink/745548642280036/)

### Review of Sign-in Sheet & DX worked

Several members have logged 5U5 with some still chasing.

### Program

John N5DF has our program tonight on Transmitter Intermodulation Distortion.

## NADXC Officers and Directors

President	Mark Brown, N4BCD
Vice President	John Stensby, N5DF
Secretary/	Kelley Vann-Johns, W4VPZ
Treasurer	
At-large	Kevin Hibbs, KG4TEI
directors	Tom Duncan, KG4CUY

## The Rise and Fall of the 0X3 Voltage Regulator Tube

by the LongPath Staff

In the late summer of 1942, concern began to build that anticipated coal and fuel oil rationing could make for a difficult winter in the northeastern, mid-western, and plains states. Home heating was the first concern, but not the only one.

Advisors to the president and military felt that the impact of shunting a percentage of the coal and oil used for electric power production to military use was best done through power brownouts rather than rolling blackouts. Under this scheme, line voltage would be reduced to around 100V. In those days, most appliances were largely resistive loads (the exception was the refrigerator, for those fortunate enough to have one), and these rather crude loads could function useably on the lower voltage.

There was one exception, and that was the radio. President Roosevelt's Fireside Chats were popular morale boosters, and it was felt they could do much to counteract bad news from Europe and the Pacific. Radios needed to continue working with compromised power. While there were a few TRF sets still around, most people had the octal version of the All-American-Five. The local oscillators in these were never paragons of stability, and operating at a lower and no doubt fluctuating line voltage (as tap-changing transformers in distribution substations attempted to regulate) promised to require a hand on the tuning knob at all times. The public would tire of this quickly.

Engineers at General Electric in Schenectady, NY devised a relatively cheap solution: regulate the second grid voltage of the converter tube, which was almost always a 12SA7. That grid functions as the plate of an electron-coupled oscillator. This would keep the oscillator stable, and not im-

pact power to any of the less-sensitive parts of the radio. And best of all, this was a simple add-on to any existing radio—you didn't have to buy a new one. Two octal sockets, one for the 12SA7 and one for the voltage regulator tube, were connected to an octal plug which plugged in to where the 12SA7 originally went. The radio was now stable enough to listen to a Fireside Chat with no re-tuning required. See fig. 1 below.

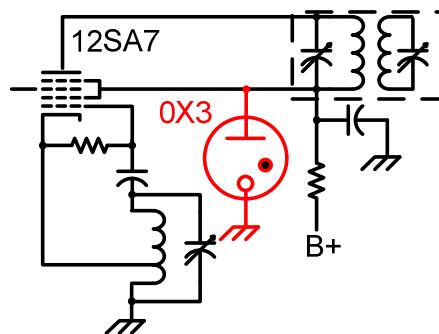


Figure 1—0X3 added to AA5 to ensure local oscillator stability.

There was one small remaining hurdle. With 100VAC coming in, the fully-loaded power supply could only guarantee about 90VDC—the drop across the rectifier tube could be quite substantial, and with the single-ended power amp blaring a full three or four watts out, 90V was a reasonable conservative number. Because gas-filled regulators require a “striking voltage” greater than the voltage at which they regulate to ionize the gas, the OB3 90V tube would not work, and the OA3 75V tube delivered too little voltage for reliable oscillator operation.

GE was just the place to handle this problem. The gas regulator had been developed around 1920 by Daniel Moore at GE Research Labs. These tubes used different mixtures of noble gasses helium, neon, argon, krypton, and xenon for various voltages from 75

to 150. Moore was aware of experiments by Ichabe Hegehirn and Regardez Caflotte around 1907 (following the Franco-Prussian Cooperation on Noble Gases, which dissipated with the onset of World War I), showing that pure helium was a good regulator at 83 volts, with a striking voltage of only 87 as shown in fig. 2. This was just the ticket! The resulting OX3 or VR-83 tube became the final entry in the octal line of gas-filled regulators. It was released somewhat secretly, since the intended use was limited to retrofitting existing radios, and not for new designs.

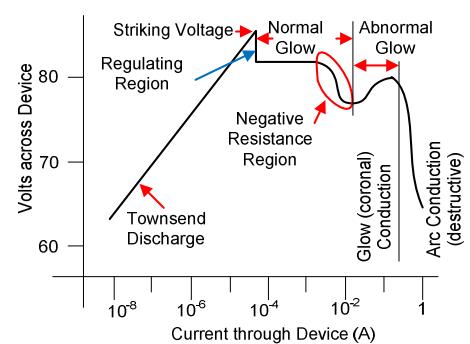


Figure 2—Characteristics of the helium-filled OX3 regulator.

As it turned out, war rationing took a different course as the winter of 1942-43 approached, and it was not necessary to institute brownouts. All-American-5s continued to work properly, and the development of the OX3 remained a secret virtually everywhere except in Schenectady, where the GE tube factory was located. GE had optimistically begun production of OX3s, and had quite a few on hand, with limited sales prospects.

The pure helium OX3 had the interesting characteristic that it floated. In air, that is—because the lift imparted by the helium was slightly greater than the weight of the tube. Because the tube was held in place at all stages of manu-

Cont'd on p. 4

## The Rise and Fall of the OX3

(cont'd from p. 3)

facturing this was not observed during production. But strangely, crates of 144 OX3s in boxes were occasionally found with one or two of the box lids open, and the tubes nowhere to be found. This was chalked up to sloppiness in the boxing department (tubes were manually inserted into the boxes in those days) when a warehouseman observed a tube escaping from a poorly-closed box. He ran to his supervisor as though he had seen a ghost and blurted out an incredible story about a floating tube rising up out of a one-gross crate and being sucked out of the building by an exhaust fan mounted some 20 feet high on a wall.



Picture 1—The original empty box, conspicuously devoid of its OX3 occupant. It is thought the notice on the tab “Tested at factory for your protection” typical to GE boxes of the period refers only to electrical characteristics, not airworthiness.

The OX3 was now a problem. Not only could they not be sold, they could not be reliably contained. Experimentation on the lift characteristics (done in very secluded places so as not to arouse worries rampant in western states about balloon-borne enemy bombs following the jet stream) showed that the tubes rarely rose above 500 feet. The lift was very sensitive to air pressure and air density. Low pressure meant very little lift, and the tube would probably not make it above 20 feet, but on a cold, crisp day

with high barometric pressure the tube would soar to its full height. It would never completely “take off” however. This was fortunate, because a lot of thought went in to how a Notice to Airmen could be sent out if an entire crate were to take flight, given that the tubes weren’t really supposed to exist.

GE workers were aware of the OX3, but as good citizens who knew that “Loose Lips Sink Ships” they kept the facts and rumors to themselves. Nonetheless it was not unusual to find a home-made OX3 barometer in a Schenectady back yard. A certain length of twine, a 1/4” hex nut, a little screw-eye and a yardstick made for a barometer which read directly in inches of mercury, as shown in the photos below.



Picture 2—OX3 barometer, still in use.



Picture 3—The close-up reveals that even a slip-shod implementation, with a wire retainer to which the load line is attached produces usable results. Pressure read near the top of the tube is 29.89 in. Hg—or is that in. He?

The saga of the OX3 was brought to an end by a timely case of war-time angst in Schenectady. Talk about U-boats heading north on the Hudson River was commonplace, but it was taken for granted they couldn’t make it to Albany, and certainly never to Waterford for the hard port turn onto the Mohawk. Surely this was a big-city concern. But the boldness and ingenuity of U-boat crews was legendary, so those living along the Mohawk and Oneida rivers spent considerable time hand-wringing over the possibility that a U-boat (aided no doubt by intelligence from un-trustworthy Canadians) would head down the Oneida from Lake Ontario and wreak havoc.

Military planners were well aware of this concern, and even though it was thought the Oneida was not navigable by U-boats, it was not beyond the public imagination for a crew of hefty Germans to portage around problematic waters, at night of course. A show of force by the citizens of Schenectady might be just what was needed to ward off the Hun and bolster public confidence in the invulnerability of the American homeland.

The entire arsenal of OX3s was therefore hauled outside the tube factory on a beautiful clear April 1, 1943. A few box lids were opened up to let a couple of tubes loose, and as they rose above the roof of the factory, light artillery (shotguns whose owners wanted some practice now that squirrel season was over) opened up to dispatch them. The shock of the guns going off, which set the local canine population to barking, and tremendous screams of approval from the assembled crowd were sufficient to nudge open some more box lids, and the skeet-shoot continued thus until the entire supply of OX3s was

Cont'd on p. 5



## DX Contests for April

By Chuck Lewis, N4NM

### OK/OM DX Contest, (SSB), (160-10M)

Apr. 8, 1200Z to Apr. 9, 1200Z

Exchange: RS plus serial; OK/OM send RS plus county code (3 letters)

See: Page 92, April QST and [www.okomdx.crk.cz](http://www.okomdx.crk.cz)

### Yuri Gagarin International DX Contest, (CW), 160-10M

Apr. 88, 2100Z to Apr. 9, 2100Z

Exchange: RST, ITU zone

See Page 92, Apr. QST and [gc.qst.ru/en](http://gc.qst.ru/en)

### Japan Int'l. DX CW Contest (CW), (160-10M)

Apr. 8, 0700Z to Apr. 9, 1300Z

Exchange: RST plus CQ zone; JAs send RST plus prefecture

See page 92, Apr. QST and [www.jidx.org](http://www.jidx.org)

### ES Open HF Championship, (CW & SSB), 80 & 40M

Apr 15, 0500Z to 0859Z,

Exchange: RS(T) plus Serial #

Note: Dups OK once per hour (see rules)

See Page 92, April QST and [www.erau.ee](http://www.erau.ee)

### Worked All Provinces of China, (CW & SSB), 80-10M

Apr, 15, 0600Z to April, 16, 0559Z

Exchange: RS(T), and serial (or province abbr.)

See page 92, April QST and [www.mulandxc.org](http://www.mulandxc.org)

### YU DX Contest (CW ), 160-10M

Apr. 15, 1200Z to Apr 16, 1159Z  
(see website for times)

Exchange: RST plus Serial #

See page 92, April QST and [www.yudx.yu1srs.org.rs/2017](http://www.yudx.yu1srs.org.rs/2017)

### SP DX RTTY Contest, (RTTY), 80-10M

Apr. 22, 1200Z to Apr. 23, 1200Z

Exchange: RST, plus Serial # or SP province

See Page 92, Apr. QST and [www.pkrvg.org](http://www.pkrvg.org)

### UK/EI DX Contest, (CW), 80-10M

Apr. 22, 1200Z to Apr. 23, 1200Z

Exchange: RST, Serial #, district

code, (if any)

See page 92, Apr. QST and [www.ukeicc.com](http://www.ukeicc.com)

### Helvetica Contest, (CW, SSB, Dig.), 160-10M

Apr. 29, 1300Z to Apr. 30, 1259Z

Exchange: RS(T) plus Serial # or Swiss canton

See Page 92, Apr. QST and [www.uska.ch](http://www.uska.ch)

### OTHERS:

International Vintage Contest HF,

April 9, 1300Z – 1900Z

Holyland DX Contest,

April 14, 2100Z to Apr. 15, 2100Z

ARI International DX Contest

1200Z, May 6 to 1959Z, May 7

Dates & times often change or are misprinted in the journals; beware!

Chuck, N4NM

## The Rise and Fall of the OX3

(cont'd from p. 4)

exhausted. This tremendous spectacle was captured for posterity by the very GE warehouse employee who noticed the first floating tube, as shown to the right.

The OX3 thus contributed to the war effort and ultimate Allied victory. It is well worth noting that not one U-boat attack on either the Oneida or Mohawk rivers occurred during the remainder of April, 1943.

Picture 4—Schenectady's fabled show-of-force, known in upstate New York as The Great Skeet Shoot of '43.



## So, I've Got this Thing...

By Kevin Hibbs, KG4TEI

So tell me if this sounds familiar. A buddy calls you on the phone and says: "I've got this thing. It's big, it's electronic, it might have tubes, and I don't know what to do with it. Do you want it?" I received just such a phone call a few weeks ago from a friend who had bought a new home. The former owner had left this heavy piece of military electronics that he had no use for and asked if I wanted to come take a look at it. My friend recognized that I had the *disease*. If you don't know about the *disease* then you missed some really good discussions by Steve Werner, AG4W. To sum it all up, the *disease* is the incurable love for all things electronic that as it progresses within the Amateur Radio Operator leads to more and more time behind the radio and collection of equipment than doing useful things like lawn work. Chances are if you are reading this article you not only have the *disease* but are already in the latter stages.

Back to the "thing". My friend was right about one thing. It was big and most definitely it was heavy. After a few minutes reading model numbers and googling it was determined that it was a military frequency meter from the late '50 to early '60s. For those of you who like such things the model number



Picture 1—The Thing, FR-114U.

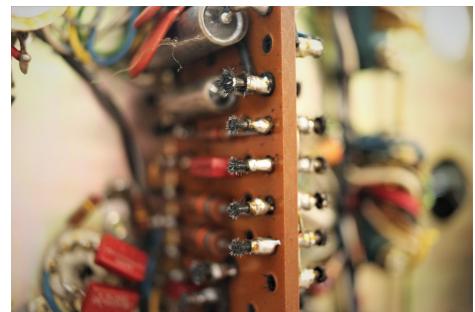
is FR-114U. The technology at the heart of the beast which produced the count was a rare tube called a *trochotron beam switch counter*. This tube,

which was state of the art at the time, had only been developed a few years before the meter was produced. The inside of the tube contained a ring of ten anodes around the outer edge with the cathode mounted in the center. An electric field controlled by the input frequency would cause the electron beam from the cathode to sweep in a circular pattern to the different anodes in sequence creating a count based on the frequency input. Within the frequency meter are several of these devices in various frequency configurations. There is also a time reference to sync all the different counter sections together. The display for the device is done via end-fire nixie tubes. Unfortunately the counter doesn't measure very high frequencies. Its manual says it should read between 20Hz to 1MHz. I guess that is good if your trying to calibrate an IF section or a Sonar, but not real useful in the world today of multi-gigahertz systems.



Picture 2—The Innards. Note lacing on wire bundles typical of military hand-crafted construction.

Of course with the *disease* I had to open the case. The top is no too impressive with only tubes protruding from the top. The bottom, however, is a work of art. It has tightly laced wire, point to point wiring, and the highest grade components of the time. There was just one problem: tin whiskers.



Picture 3—Many dreaded tin whiskers.

They protrude from most of the solder posts on the different connecting boards. I had already decided that I was not going to power up the unit, but this ended all temptation to try it out. As you can see from the included pictures the whiskers are severe and I would rather not risk a fire.

So, I have this *thing*. If it hasn't left my house by the time you read this article I would be happy to share my *disease* with someone else; someone who might appreciate it more than I do and put it to good use. Oh, did I mention it has a lot of spare tubes and the manual was included in the lid of the shipping box? I know those of you with the *disease* just perked up a little bit.

## The LongPath Staff

**Publisher/Editor:**

Tom Duncan, KG4CUY

**Departments:**

Chuck Lewis, N4NM, DX Contests

Kelley Vann-Johns, W4VPZ, Minutes

Mark Brown, N4BCD, From the President